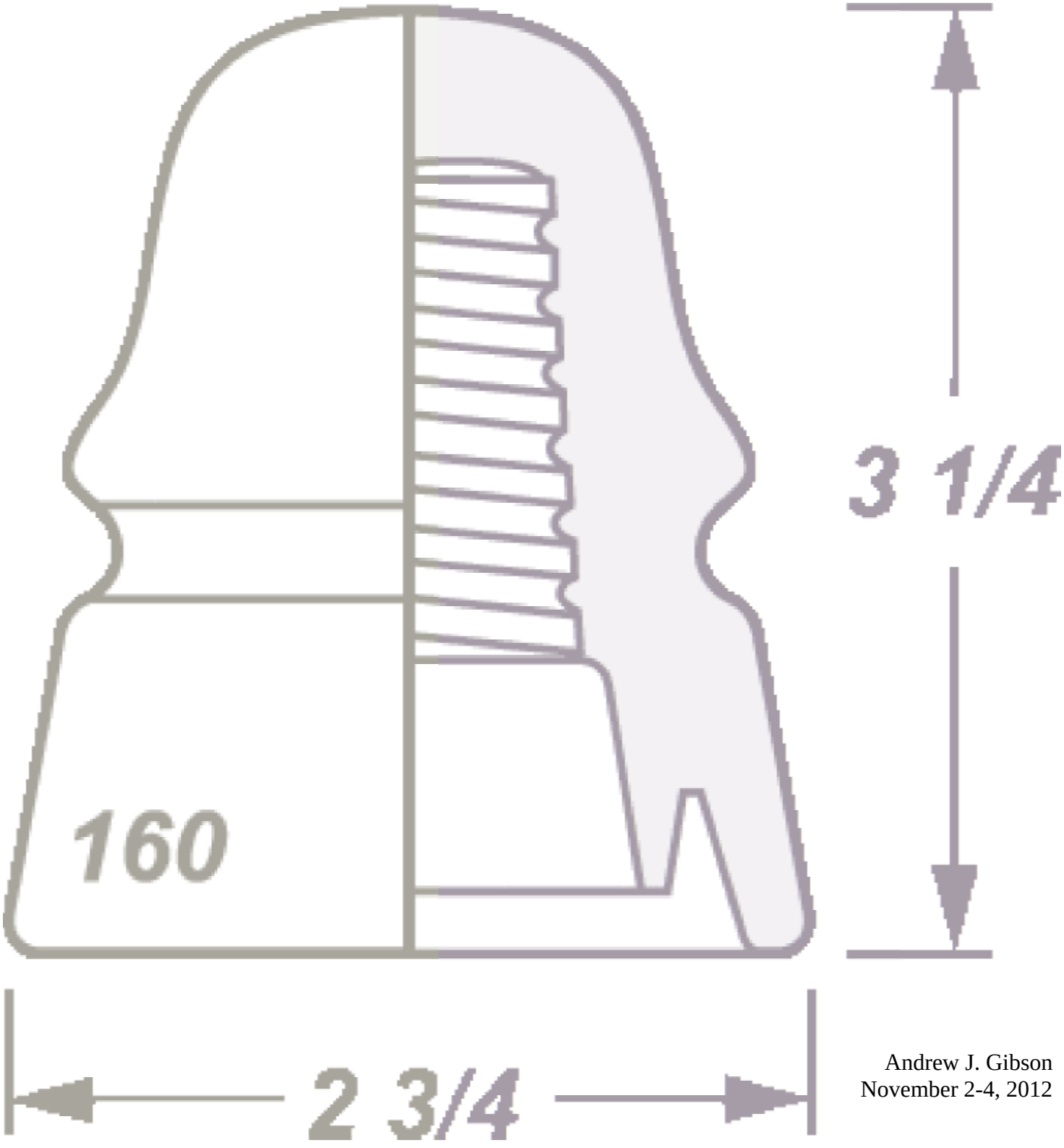
baby signals

1899 to 1957



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A Brief History

One day in 1889, Henry Shay walked into the office of Ralph Hemingray. In his hand, he was holding a common H.G. CO. double petticoat signal insulator. He walked up to Ralph, placed the insulator on his desk, and asked "Can you make me one of these, but smaller?" Ralph picked up the insulator, then called one of his men in and asked how long it would take to make up a new mold. Henry liked the answer, and before you know it, Hemingray had started to make what we know as the CD 160 "baby signal". This first baby signal was embossed "S.S.& CO." for the Chicago based company Henry was representing: Shay, Stephens, and Company.

It probably did not actually happen that way, but something along those lines certainly did. In 1889, telephone use was expanding at a great rate, and Chicago was in the midst of it. When Alexander Graham Bell first used a phone to say "Mr. Watson, come here, I want to see you." it was 1876. In 1877 Western Union entered the telephone business, and in 1878 Edison demonstrated a 130 mile telephone line. By 1883 a non-commercial telephone line from New York to Chicago was in operation, in 1885 American Telephone & Telegraph was formed, and by 1892 Am. Tel. & Tel. was operating the first commercial line from New York to Chicago. This rapid growth in the use of telephones obviously required the support of a large infrastructure, and there was money to be made in its building.

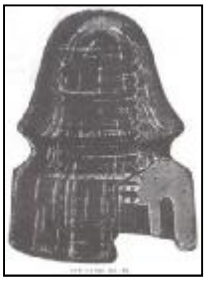


Figure 1: S.S. & CO. No. 40

Charles Stephens lived in Chicago, and worked in the glass trade, whether as a glass worker or selling glassware is uncertain. He, Henry Shay, and M. D. Stephens evidently decided to become glass brokers, forming Shay, Stephens & Company. They appear to have contracted with Hemingray to supply the glass insulators they sold. A January, 1890 article in "Electrical Industries" talks about the S. S. & Co. insulators, in both porcelain and glass. The only examples of these insulators that have ever been found bearing the S.S & CO. name, are their numbers 19 and 40 (although a slightly later product of theirs, a nail knob style number 35, has recently been discovered). The Number 19 is a "double petticoat deep-grooved insulator", and is what we know as a CD 162. The Number 40 is a "'double petticoat' of medium size", and is the CD 160 baby signal. This shape has seen extensive use in the construction of telephone lines. Telephones do not require as much insulation as other power lines, and a smaller insulator was certainly less expensive. This insulator became known in the trade as a "double petticoat pony insulator." It was intended for use on telephone lines, but was also used on railroad telegraph spur lines, fire alarm signal lines, and even as a tree insulator.

Figure 2 CD 160.7, 162, 160.6, and 160.

The idea to create the popular "double petticoat deep-grooved" CD 162 in a smaller size did not really originate with Shay, Stephens & Company. There are some similar insulators that were made prior to 1889. The signal style itself goes back to the threadless era. The double petticoat came into use in the United States around 1883, and was patented by Samuel Oakman late in that year. The CD 160.7 snowcone made by the American Insulator Company was made between 1883 and 1886, and likely preceded the CD 162 shape by a few years. The CD 160.6 AM. TEL. & TEL. pilgrim hat, which is probably the closest in shape to the CD 160, was made circa 1887 to 1889 by the Brookfield Glass Company. Whether Shay, Stephens & Company had ever seen the CD 160.6 is unknown, but it appears that the style we know as the CD 160 originated with S.S. & Co., as theirs is the first actual CD 160 identifiable.

It is interesting to note that this CD 160 is slightly larger than the later CD 160s that are more familiar to us. The early H.G. Company baby signal that was made in the same mold as the S.S. & Co insulators is also larger than normal, as are the baby signals produced in the King City Glass Works molds. After S.S. & Co. ceased

Figure 3 SS&CO, H.G.CO with SS&CO blotout, W Brookfield, KCGW, and NO NAME

operations, it appears that Hemingray decided that this insulator style was worth continuing to make. They reduced the size slightly, and the more typically sized CD 160 came into being. All subsequent manufacturers of this style produced an insulator that was pretty much the same shape and size as the redesigned Hemingray version. Note that the leakage path distance appears approximately the same in both sizes, so the reduction in size led to decreased production costs at little if any expense in insulating capability.

Brookfield began production of this style around 1893, shortly after Hemingray began selling them. Hemingray and Brookfield were the two largest producers of glass insulators at the time, and it is evident that this new style was popular. One smaller manufacturer, the King City Glass Works of Fairmount, Indiana, also began production of this style around the same time. The early 1900s appear to have been the "boom years" for the baby signal – not only did Brookfield and Hemingray produce this insulator in great numbers, but other manufacturers started production of them as well. Sterling Glass Company, Harloe Insulator Company, Ohio Valley Glass Company, and the California Glass Insulator Company were all small companies that produced the CD 160. Porcelain companies also got into the act. Pony sized versions from New Lexington High Voltage Porcelain Company, Lima Insulator Company, R. Thomas & Sons Company, Pittsburg High Voltage Insulator Company, Illinois Electrical Porcelain Company, General Porcelain Company, R. Thomas & Sons, and perhaps others, and for the Johns-Manville Company, were produced in the early part of the 1900s.

As Tree Insulators

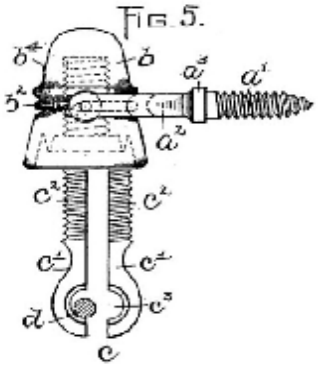


Figure 4 Holme's Tree Insulator

In addition to the normal uses for telephone and fire alarm signals, the baby signal gained popularity as a tree insulator. Almost from the beginning of electrical lines, problems with wires and trees were encountered. In 1860, George Prescott, superintendent of electric telegraph lines, wrote that "Many lines have been seriously injured by the improper use of rods of iron, extending between posts situated upon opposite sides of a street, to which were attached insulators, for the purpose of conducting wires out of the branches of trees. Such rods have been used in many of the cities and villages in Connecticut, where there are great numbers of shade-tress; but it was found that in damp weather they caused great escape from one wire to another, and they were consequently removed."

In 1889, utility patent 403,491 was granted for a split, octagon shaped forestry insulator called "The Victor". In 1890, the "Brodie" insulator was patented, which holds an insulator in a bracket and has a screw to attach to a tree. Ads from 1897 show a version of the Brodie insulator different from the patented version, with a bracket to hold the insulator, and a pivot on the lag screw to allow the angle to be set. This version made use of either a CD 114.2 or a CD 162 as the insulator portion. In 1899 the Holmes tree insulator was patented. This was almost identical to the "Brodie", though using the CD 160. The lag screw had no pivot, but instead let the insulator swing freely in the bracket. The insulator used for the Style B was "The Victor" insulator. This undoubtedly worked better – based on surviving examples, the Holmes version appears to have been quite a bit more popular. Ads for this insulator are known from the early 1900s, and it appears in catalogs up until the early 1920s. Other competing tree insulators, such as the Cutter, patented in 1904, and the Dunton patented in 1905 and shown in ads through 1914 at least, attest to the depth of the problem. The Holmes style of insulator probably went out of favor in the mid-1920s with the introduction of simpler and less expensive versions such as the Hendee tree insulator and the twist lock G&A tree insulator, the latter of which was patented in 1926.

Then came World War I. By this time, the smaller companies had gone out of business, and Brookfield and Hemingray remained as the lone producers of this style in glass. However, in 1918 Brookfield was the victim of sabotage and suffered a substantial loss. A little over a year later, in late 1919, the Thomas Gillespie shell loading plant suffered a catastrophic series of explosions. Many nearby factories suffered serious damage, including the Brookfield plant in Old Bridge, New Jersey. By 1921, Brookfield had ceased production of insulators, and they officially went out of business in 1922.

Brookfield had been a major supplier of insulators, and with their departure much of this demand moved over to Hemingray. However, a number of other companies saw an opportunity, and decided to get into the insulator business. Gayner Glass Works, Lynchburg Glass Works, Whitall Tatum Company, and McLaughlin Glass Company started production of insulators in the early 1920s, and they all made CD 160s. Gayner and Lynchburg were short-lived, both being out of business by 1925. McLaughlin lasted longer, from 1922 until 1935, at which point Crystallite Products Corporation bought their equipment and started producing insulators exclusively for Maydwell & Hartzell. They, too, though, went out of business not long after, in 1940. Porcelain versions of the baby signal appear to have stopped being produced by the 1930s.

Whitall Tatum, on the other hand, proved more successful. A well-established company in the glass business at the time, Whitall Tatum started making insulators in 1922. The company was bought by Armstrong Cork Company in 1938, then by Kerr Packaging Products in 1969. They last produced insulators in 1975, making them the last company in the United States to produce glass pin-type insulators. Owens-Illinois, who had taken over Hemingray in 1933, last produced insulators around 1970. Both companies, though, ceased production of the CD 160 some time prior to this, probably in the late 1950s.

While the baby signal shape was definitely popular, it was also not ubiquitous. There were many large companies that, while they did make insulators for telephone use, did not make a baby signal style. In glass, the Baltimore Glass Manufacturing Company (1890 – 1896) was around at the start of the baby signal time period, and made small telephone insulators such as the CDs 102 and 133, but not the CD 160. In the mid-west, the sequence of Good (1897-1899), Western Flint Glass Company (1899-1900) and the Western Glass Manufacturing Company (1900 – 1909) made CDs 106 and 121, but not the CD 160. Other small companies such as New England Glass Manufacturing and Westinghouse also made telephone insulators but again not the CD 160. More interestingly, Diamond (1890 – 1913) and the Dominion Glass Company (1913 – 1967) made a large selection of telephone insulators without ever touching on the baby signal. Few baby signals are found in Canada, and, while the CD 162 did see some production by the Hamilton Glass Company (1890 – 1891), the main signal shape used was the CD 162.4. Nor was the CD 160 a shape that was ever produced by any non-United States company, in noticeable contrast to many other U.S. styles such as the CD 121, 154, 155, 162 and more.

In porcelain, many if not most of the larger producers didn't make the smaller baby signal size. Fred Locke (1895 – 1903) didn't, though he did make some slightly larger signal styles. The Locke Manufacturing Company (1903 – 1969) made many signal styles, but mostly larger petticoat rest styles. Lapp (1916 – 1957) and Pinco (1920 – 1987) both only made larger petticoat rest versions. Ohio Brass (1907 – 1970s) made a few skirt rest signals, though again all larger styles, and mainly petticoat rest versions. The same pattern held with many of the smaller companies of the time, too, where we see Findlay (1911 – 1927), Porcelain Products Inc. (1927 – 1956), Knox (1923 – 1975), Franklin Porcelain (1927 – 1928/9), Square D (1925 – 1951), and Westinghouse (1921/2 – 1953) all make almost exclusively the larger petticoat rest styles.

In porcelain, the baby signal seems to have gone out of vogue by the 1930s at the latest. The rise of porcelain insulators and the decline in open-wire lines, together with technological innovations such as fiber optics, lead to smaller and smaller demand for glass insulators as well. When Armstrong and Owens-Illinois stopped producing the CD 160 in the mid to late 1950s, they brought to an end almost 70 years of continuous production of this style. This makes the baby signal one of the longest-lived styles ever produced.

1889 to 1890 **Shay, Stephens & Company** **Chicago, Illinois**

Chicago directories list Shay, Stephens & Co. in 1889 and 1890. Directory entries for Messrs. Shay and Stephens in 1888 and 1891 show no association with S.S. & Co., leading one to conclude that this was a very short-lived company that existed in 1889 and 1890 only.

The insulators embossed "S.S. & CO." were made for Shay, Stephens & Company. A journal article from January, 1890 calls their No. 40 insulator a "'double petticoat' of medium size". This was undoubtedly the first CD 160 produced. This insulator is noticeably larger than normal CD 160s.

The insulators were almost certainly made by Hemingray. Hemingray obviously had the molds for these insulators as evidenced by their H.G.CO. embossed unit with the S.S.& CO. blot out, and shards of the S.S.& CO. insulators have been found in the Muncie dump. Even more convincingly, the embossing style is distinctly the same as the Hemingray script embossing of that period, and the colors the S.S. & Co. insulators come in are consistent with Hemingray production at the time.

Start	End	Description
1889	1890	[010] (F-Skirt) S.S & Co. MFG'S./CHICAGO/N› 40 (R-Skirt) DOUBLE/PETTICOAT SB

1890 to 1956 **Hemingray Glass Company** **Muncie, Indiana**

Hemingray has a long history of glass production, producing bottles, fruit jars, lamps, and numerous other items. They started making insulators in the late 1860s, in Covington, OH, and in 1870 they incorporated as the Hemingray Glass Company. Throughout this time, they produced bottles, fruit jars, lamps, and numerous other items. In 1888, Hemingray started production of insulators at a new facility in Muncie, IN. The Covington site continued to be used until very early 1894 at the latest. In 1933, Hemingray Glass Company was sold to Owens-Illinois Glass Company. Insulator production continued until 1967, when the last Hemingray insulators were made by the Indiana Glass Company in Dunkirk IN.

Hemingray was probably the largest producer of CD 160s, and certainly produced them over the longest time span. They produced the very first one, made for Shay, Stephens & Co. around 1889, and their production continued for almost 70 years, until 1956 or a little later. Production appears to have occurred only at the Muncie, IN location. When the molds for the last insulators being produced by Hemingray were sent to the Indiana Glass Co. plant in Dunkirk in 1967, the molds for the CD 160 were not included. Presumably the style ended prior to this, likely sometime in the late 1950s (though after 1956 as examples with this date are known).

Start	End	Description
1890	1893	[140] (F-Skirt) H.G.CO./['S.S & Co. MFG'S./CHICAGO' blotted out]/N› 40 (R-Skirt) DOUBLE/PETTICOAT SB Probably made shortly after S.S. & Co. ceased to exist in 1890, and prior to the introduction of drip points around 1893. This insulator style is noticeably larger than any other Hemingray CD 160. There are very few of these known to exist, and this is among the most difficult CD 160 embossing variations to locate.
1890	1893	(F-Skirt) H.G.CO. (R-Skirt) PETTICOAT SB [020] {Old Script} [120] {Old Script, 'A' mold} SB made prior to the introduction of drip points.

Start	End	Description
1892	1893	(F-Skirt) H.G.CO. (R-Skirt) PETTICOAT SDP [030] {Old Script} [130] {Old Script, 'A' mold} **Possibly not a valid Embossing Index** [010] {Old Script} RDP. The H.G.CO. SDP vs. RDP debate. Many believe that RDP does not exist on H.G.CO. insulators, and are merely a slightly underpoured SDP. SDP without the May 2, 1893 patent date. Patent was applied for on January 3, 1893. Presumably drip points were added shortly before the granting of the patent. The "A" appears to be just a mold letter, with no known significance.
1893	1895	(F-Skirt) H.G.CO./PATENT MAY 2 1893 (R-Skirt) PETTICOAT {Smooth base mold; transition style embossing} SDP [060] {Transition} [105] {Transition, 'A' mold} When the May 2, 1893 patent was granted, the existing molds had the date added underneath the H.G.CO. embossing. This transition embossing style was short lived and probably only lasted as long as the molds.
1895	1898	(F-Skirt) H.G.CO./PATENT MAY 2 1893 (R-Skirt) PETTICOAT SDP [050] {New Script} New Script style circa 1895 to 1898
1896	1902	(F-Skirt) H.G.CO./PATENT MAY 2 1893 (R-Skirt) PETTICOAT SDP [050] {Prism} Prism style circa 1896 to 1902

Start	End	Description
1900	1915	(F-Skirt) H.G.CO./PATENT MAY 2 1893 (R-Skirt) PETTICOAT SDP [050] {Stamp} **Error Embossings** [070] {'C' over 'O'} [080] {'E' over '8'} [085] {'E' over 'A'} [090] {'PETTICOET'} [095] {'9' is upside down 'G'} [097] {'T' over 'T', '89' over '89'} [100] {'P' over 'M', 'PEITTICOAT'} [110] {'PATTENT'} [150] {Note extra periods} [000] {Note 'I' is a '1' in 'PETTICOAT', o/w sim. [150]} possible [000] {'E' over '5'} **Possible Inclusion** [005] {Note no periods} is possibly this style. **Possibly not a valid Embossing Index** [040] RDP is possibly this style, but not intentionally molded as RDP Stamp style starts circa 1900. The end date is somewhat speculative, but there are a few clues. The 1893 patent expired in 1910, and so undoubtedly this style continued through then. There is a CD 202 made by Hemingray that bears the No 14 style number, but there are no catalogs showing the CD 202 prior to 1910. By 1915, the CD 202 is shown in catalogs as style number 53 (and, in fact, there are known pieces bearing the No 53 embossing over a blotout of the No 14 style number), and the CD 160 is shown as No 14. Obviously sometime between 1910 and 1915, the switch was made to use No 14 for the baby signal. Given the huge number of these stamp H.G. CO. versions, and the significantly lesser quantity of the Hemingray No 14 versions, I tend to lean towards a later date for the switch.
1915	1919	(F-Skirt) HEMINGRAY (R-Skirt) Nœ 14 SDP [020] **Embossing Modifications** [165] {"HEWINGRAY" and "NO" over 'Nœ'} **Error Embossings** [025] {'1' is upside down} [170] {'HEWINGRAY'} **Possibly not a valid Embossing Index** [010] RDP perhaps not intentionally molded as RDP. Could be an early example of RDP, though. "HEMINGRAY No 14" embossing style probably started around 1915 when the style number started to be used in catalogs. Usage continued until 1919 when MADE IN U.S.A. was added per international trade agreements.

Start	End	Description
1919	1920	[080] (F-Skirt) HEMINGRAY-14/PETTICOAT (R-Skirt) MADE IN U.S.A./['H.G.CO.' blotted out]/PATENT MAY 2 1893 SDP [120] (F-Skirt) HEMINGRAY-14/['H.G.CO.' blotted out]/PATENT MAY 2 1893 (R-Skirt) MADE IN U.S.A./PETTICOAT SDP In early 1918, sabotage at Brookfield destroyed 28 freight cars of finished product. In late 1919, explosions at the Thomas Gillespie shell loading plant devastated the Brookfield plant in Old Bridge, New Jersey. Production of insulators may have stopped then, and Brookfield went out of business in 1922. I theorize that Brookfield's troubles threw significant demand over to Hemingray (and other companies such as Gayner and Whitall Tatum who got into insulators as a direct result of Brookfield exiting the market). Initial demand could not be met with molds on hand, so they ordered new ones. While waiting for these, they took some old molds out of storage, retooled them, and used them until the new molds were ready. This was probably fairly soon, by 1920, but theoretically they could have been produced up to the point that drip points became round in 1923.
1919	1923	(F-Skirt) HEMINGRAY-14 (R-Skirt) MADE IN U.S.A. SDP [040] [060] {'No 14' blot out} **Error Embossing** [180] {'HEWINGRAY' and 'No 14' blot out} MADE IN U.S.A. added per international trade agreement in 1919. Round drip points came into use around 1923 Note: [060] has HEMINGRAY centered, -14 added to right. [040] has Hemi-14 centered
1923	1931	(F-Skirt) HEMINGRAY-14 (R-Skirt) MADE IN U.S.A. RDP [030] in non-"clear" colors, non-"7-up" Round drip points start around 1923. Switch to "clear" (ice tints) glass in 1931 per Western Electric Company request in 1931
1925	1931	(F-Skirt) HEMINGRAY-14 (R-Skirt) MADE IN U.S.A. RDP [030] in "7-up" color Hemingray, left with extra capacity due to improvements in automatic insulator machinery, re-entered the bottle marked in 1925. In the late 1920s through early 1930s, Hemingray produced many soda bottles, refrigerator bottles, and jugs in emerald green (what we call 7-up), in 2 different shades. These were undoubtedly made from the same glass being used for bottle production. Switch to "clear" (ice tints) glass in 1931 per Western Electric Company request in 1931.
1931	1933	(F-Skirt) HEMINGRAY-14 (R-Skirt) MADE IN U.S.A. RDP [030] in "clear" colors of blue tint, green tint, ice green [000] in "clear" colors of blue tint, green tint, ice green, with "HEMINGRAY" blotout Switch to "clear" glass in 1931 per Western Electric Company request. Owens-Illinois purchased Hemingray in 1933, and added 'O' to embossing, so those without the "O" came before that.

Start	End	Description
1933	1934	(F-Skirt) HEMINGRAY-14/[Number] (R-Skirt) MADE IN U.S.A. RDP [085] [005] {(Dome) [Number]} [110] {'HEMINGRAY' blot out under 'MADE IN U.S.A.'} Made in 1933 when Owens-Illinois purchased company. NOTE: [Number] under 'HEMINGRAY-14' is always an 'O', presumably for "Owens-Illinois".
1934	1938	[090] (F-Skirt) HEMINGRAY-14/[Numbers and dots] (R-Skirt) MADE IN U.S.A. RDP [100] (F-Skirt) HEMINGRAY-14/[Numbers and dots] (R-Skirt) MADE IN U.S.A./[Number] RDP Large lettering. Mold set made in 1934. Runs through 1938 when small lettering introduced, and molds were reworked. There were probably 32 molds – known are 1-9, 11-14, 16-18, 25, and 28.
1938	1956	(F-Skirt) HEMINGRAY-14 (R-Skirt) MADE IN U.S.A./[Numbers and dots] RDP [050] [130] {Small lettering replaces large}  **Figure 5 Narrow and Wide dome** Small lettering. Mold set "made" in 1938, probably of at least 32 molds. There were at least some 1934 molds that were retooled and re-embossed with the 1938 date. End date is unknown, but runs to at least 1956. Note that there are at least two mold variations: a "wide" dome and a "narrow" dome. The "narrow" variant is the more common – only 3 molds are known in the "wide" style: 19, 20, and 30. All three of these exhibit signs of mold repair along the ML, so perhaps these are older. NOTE: the 1934 and the 1938 mold sets both appear to have 32 molds, and we know that the 1934 mold set was reworked to produce the 1938 set. It is quite possible that the [050] embossing variant with no blotout does not actually exist, as all of these may have a blotout even if not easily visible. There were probably 32 molds – known are 1-2, 4-25, 27-31.

1890 to 1894 **H.E. Swift Manufacturing Company** **Boston, Massachusetts**

Incorporated in late 1890, the H. E. Swift Manufacturing Company succeeded the business of H. E. Swift & Company, which was involved in "manufacturing electricians". A June 28, 1890 ad for the Brodie insulator gives the address of H.E. Swift & Company as 62 Sudbury Street in Boston. In late July, they moved to 34 Oliver Street in Boston, which is reflected in an October, 1890 ad, also for the Brodie insulator.

All ads for these show an insulator matching the patent drawing. Presumably they continued being made until The Brodie Electric Company started making the version that appeared in later ads, sometime around 1894.

Start	End	Description
1890	1894	No known specimens

1893 to 1895 **King City Glass Works** **Fairmount, Indiana**

Products probably date from 1893 - 1895. The factory burned in April, 1895, and was sold in February 1896 to the Marion Fruit Jar & Bottle Company, after having been shut down for nearly a year with the exception of a few weeks in the summer of 1895. This CD 160 is noticeably larger than normal CD 160s, but different than the S.S. & Co. large style. K.C.G.W. probably copied the design from Hemingray – evidence shows some link between the two companies, perhaps the use of a common mold-maker

Start	End	Description
1893	1895	[010] (F-Skirt) K C G W (R-Skirt) [Number] SB [Number] is always 2 – thought to be the style number.

1893 to 1908 **Brookfield Glass Company** **Brooklyn, New York**
1897 to 1922 **Old Bridge, New Jersey**

Brookfield, another well established glass company, appears to have entered the market for CD 160s shortly after Hemingray and K.C.G.W. Production continued until either 1919, when the Thomas Gillespie explosion occurred, or 1922 when Brookfield went out of business. Note that the Old Bridge and Brooklyn plants operated simultaneously for a while, but William Brookfield remembers a distinct change in glass color in 1908 when new sand from NJ instead of Long Island started being used.

Start	End	Description
1893	1897	[020] (F-Crown) (Arc) W‹ BROOKFIELD/NEW YORK (F-Skirt) PAT'D NOV. 13 ³ , 1883 {MLOD} SB The dates are somewhat speculative. Embossing on the crown without an address started around 1893. The crown embossing was dropped around 1898. 1893-1897 is the likely production time period.
1897	1903	[070] (F-Skirt) W. BROOKFIELD/N.Y. (R-Skirt) PAT'D.NOV. 13 ³ 1883 SB Crown embossing moved to skirt sometime around 1897-1898. MLOD stopped being used "around the turn of the century". The patent expired in 1900. The "W" in Brookfield was effaced at the time of William Brookfield's death on May 13 1903, though they started not using it prior to that (probably around the 1898 incorporation).
1903 ?? 1898	1905 ??	[060] (F-Skirt) BROOKFIELD/N.Y. (R-Skirt) PAT'D NOV. 13 ³ 1883 SB "W" dropped either at incorporation in 1898, or on William Brookfield's death in 1903. Start date could have been earlier -- but no earlier than 1898 or so. End date is speculative -- would probably have been not too long after 1900 when the patent expired, and then the mold ran out.
1903	1905 ??	[080] (F-Skirt) ['W.' blotted out] BROOKFIELD/N.Y. (R-Skirt) PAT'D NOV. 13 ³ 1883 SB "W" removed from all molds when William Brookfield died in 1903. End date is speculative -- would probably have been not too long after 1900 when the patent expired, and then the mold ran out. Certainly after 1903 given the effacing of the "W" wasn't done until then.

Start	End	Description
1903	1908	[010] (Dome) [Number] (F-Skirt) BROOKFIELD (R-Skirt) NEW YORK SB {Brooklyn colors} [040] (F-Skirt) BROOKFIELD (R-Skirt) NEW YORK SB {Brooklyn colors} "W" dropped totally upon William Brookfield's death. Made prior to the introduction of the darker sand from New Jersey. BROOKFIELD [010] Numbers: backwards 4, 3, 1
1908	1922	[010] (Dome) [Number] (F-Skirt) BROOKFIELD (R-Skirt) NEW YORK SB {Old Bridge colors} [040] (F-Skirt) BROOKFIELD (R-Skirt) NEW YORK SB {Old Bridge colors} [010] (F-Skirt) B SB Colors are typical post-1908 manufacture. End date either 1919 or 1922, depending on what you believe. [010] Numbers: backwards 4
1909	1922	[015] (Dome) [Number] (F-Skirt) BROOKFIELD (R-Skirt) NEW YORK SDP [050] (F-Skirt) BROOKFIELD (R-Skirt) NEW YORK SDP [030] (F-Skirt) BROOKFIELD SDP [020] (F-Skirt) B SDP First Brookfield production with drips was circa 1909. Note these are all darker colors typical of post-1908 production. [015] Numbers: backwards 4
1915	1922	[030] (F-Skirt) B (R-Skirt) № 32 SB It is generally agreed that molds with style numbers were among the very last of the Brookfield production. The start date is somewhat speculative.

1894 to 1909 **The Brodie Electric Company** **Manchester, New Hampshire**

The Brodie Electric Company was incorporated in June, 1894. The Brodie Electric & Automobile Company was incorporated June 15, 1909, with no mention of J. Brodie Smith, nor of insulators. By 1920, the Brodie Electric & Auto Co. in Manchester was engaged in Auto Repairs, again with no mention of insulators. And in 1925, there was a Brodie Electric Company in the Virginia State Directory of Business under Electrical Contractors & Supplies. It is difficult to know exactly when the Brodie tree insulators were made, but catalog and ad evidence gives a start date of 1894. The 1914 Pettingell-Andrews Company catalog shows the Brodie insulators. It is possible that they were selling stock on hand, and it's also possible that they were manufactured after the 1909 date.

Start	End	Description
1894	1909	Of the 3 examples I know, one has a CD 162 STAR, one has a CD 112 S.B.T. & T. CO, and one has a CD 112 BROOKFIELD. There were multiple versions of this sold, basically a large and a small (similar to the two Holmes tree insulator styles). The large appears to have been the CD 162, and the small was shown in catalogs and ads as a CD 114.2, but appears to have been a CD 112 in reality.

1896 to 1898 **Marion Fruit Jar & Bottle Company** **Fairmount, Indiana**

The King City Glass Works burned in April, 1895, and was purchased by Marion Fruit Jar & Bottle Company in February, 1896. It is theorized that they manufactured all the NO NAME 160s. The [030] and [040] variants may have come first, followed by the [010], [020], and [050] variants as they added a means to prevent the insulator from spinning when released from the mold. There is also a version with a number "3" embossed on it, which must have been later, as there is a blot out of the dot from the other versions. Production probably continued until at least 1898. These CD 160s are noticeably larger than normal CD 160s – identical to the KCGWs and different from the S.S. & COs.

Start	End	Description
1896	1898	[010] (F-Skirt) [Glass dot] (R-Skirt) [Glass dot] {K.C.G.W. product} SB [020] (F-Skirt) [Glass dot] (R-Skirt) [Number] {Tall narrow dome} {K.C.G.W. product} SB [030] (F-Skirt) [Number] (R-Skirt) [Blotted out embossing] {K.C.G.W. product} SB [040] (F-Skirt) [Number] (R-Skirt) [Number] {K.C.G.W. product} SB [050] (F-Skirt) [Vertical bar] [Vertical bar] (R-Skirt) [Number] {K.C.G.W. product} SB [000] (F-Skirt] 3 [Blotouts] SB The [050], while rare, is the most common of these. The [Number] for all is always a "2".

1899 to ~1925 **High Tension Electrical Specialty Company** **Newton, Massachusetts**

The Holmes Tree Insulator was patented May 30, 1899. All ads, as well as company directories, indicate that they were made by High Tension Electrical Specialty Company. The last known ad for the Holmes was the 1924 Pettingell-Andrews Company catalog.

Start	End	Description
1899	1901	Style A1, for smaller wires, composed of a split pin that matches the patent drawing.
1899	1925	Style B, for larger wires
1901	1913	Style A2, for smaller wires, composed of a solid pin with a "cutout" around a porcelain bushing that was wired in place. Advertised in 1901 as the "improved" version.
1912	1925	Style A3, for smaller wires, composed of a solid pin, and a porcelain bushing held in place with a metal strap. Catalog in 1912 shows Style A2, ads in 1913 show Style A3.

1900s to 1930s **Unknown Porcelain Manufacturers** **Various locations**

Many porcelain pieces were made with no markings at all. Some of these are attributable to known manufacturers, but there are many where it is simply not known who made them. Dates can't really be established for these, but it seems reasonable to assume they were made from the early 1900s through the 1930s or so.

Start	End	Description	
1900	1930	N-N	
		U-233	[050] brown, light blue
		U-234	[050] brown, gray, light blue, green
		U-236	[050] {Wet Process} white, gray, dark blue; [100] {Dry Process} brown
		U-237	[050] brown; [100] {Sim. Composition to Brick} pinkish-tan
		U-238	[050] white
		U-238A	[050] brown, white, gray
		U-238B	[050] {Wet Process} brown, white, blue; [100] {Dry Process} brown, gray
		U-239	[050] {Wet Process} brown, gray, green; [100]{Dry Process} brown; [150] {Dry process, ML to upper ridge} light blue
		U-239A	[050] {Dry Process} brown
		U-239B	[050] white, green
		U-239D	[050] {Dry Process} white
		U-240	[050] {Wet Process} charcoal, white, gray; [100]{Dry Process} brown
		U-241	[050] brown, gray, green
		U-241C	[050] brown, white

1900s to 1930s **G** **Unknown Location**

This is an unattributed porcelain marking, probably made sometime similar to the unmarked units. It is thought possible that these may have been made by Illinois Electric Porcelain Co, circa 1910-1919.

Start	End	Description	
1900	1930	U-236 G	[050] {dry process, emb} brown
		U-238B G	[050] {dry process, emb} brown
		U-239B G	[050] {dry process, emb} brown

1901 to 1910 **STAR** **Schenectady, New York**

The STAR embossed insulators were made by a series of companies for General Electric Company, the STAR being General Electric's logo.

The first companies were located in Elmer, New Jersey. The Novelty Glass Manufacturing Company was in business from December 1901 through late 1903, in the "upper" glassworks, when they were forced out of business by patent infringement suits from Brookfield. Jonathan Parker bought the plant in 1904, and operated it under the name of Elmer Glass Company until around 1907. Sterling was in business from April, 1901 to August, 1903 in the "lower" glass works at Elmer, at which time Harloe took over operation of the plant. They

ran until October, 1903, at which point the plant was bought by Parker and the Elmer Glass Company took over operation. Novelty, Sterling, Harloe, and the Elmer Glass Company may all have made these insulators. I find it likely that Novelty and Elmer Glass Company were the only ones to produce them, though, as both Sterling and Harloe share a distinct baby signal profile that I have never seen in a STAR version.

When the Elmer Glass Company went out of business around 1907, General Electric evidently contracted with Brookfield to produce insulators for them. It is thought that GE fairly quickly stopped requesting the special embossing, and used generic insulators.

Start	End	Description
1901	1907	[010] (F-Skirt) ¥ SB {Novelty/Elmer Glass Co, ½" point up, light blue and greens, Elmer ring}
1908	1910 ?? 	[010] (F-Skirt) ¥ SB {Brookfield, 3/8" point down, darker aquas} Darker aqua indicates Old Bridge, NJ production. End date is speculative.

1902 to 1903 **Sterling Glass Company** **Elmer, New Jersey**
1903 to 1907 **Elmer Glass Company** **Elmer, New Jersey**

April 11, 1902 newspaper accounts say that Sterling Glass Company was to make use of the "lower works" in Elmer, and on April 23 reported starting of furnaces. The plant was taken over by Harloe Insulator Company in March, 1903, and then sold to Jonathan Parker in November, 1903. It is not known how much if any production occurred after this, though a January 22, 1904 entry in paper says insulator production had once again been started by the Elmer Glass Company. Personal recollections from Eugene W Bostwick indicate insulators were in production around 1905, and that the plant probably closed around 1907. It is possible that the Elmer Glass Company continued to use Sterling molds, so the end date might be slightly later.

Start	End	Description
1902	1903	[010] (F-Skirt) STERLING (R-Skirt) £ SB

1902 to 1920s **Trenton Porcelain Company** **Trenton, New Jersey**

The Trenton Porcelain Company was incorporated in early 1902, and was a manufacturer of standard porcelain, Findlay knobs, and cleats. Production continued into the 1920s. Attribution of this shape to Trenton is based on an undated catalog in the Smithsonian showing 11 styles of pin-type insulators, including this distinct shape.

Start	End	Description
1902	1920s	[N-N] U-236A [050] {dry process, emb circle in pinhole} black/tan

1903 to 1905 **Ohio Valley Glass Company** **Pleasant City, Ohio**

The Ohio Valley Glass Company was incorporated August 16, 1902, and the plant property was purchased September 16, 1902. Library of Congress fire insurance maps in 1905 show that the plant closed as of April, 1905. The company was sold on August 6, 1906 to the Hemingray Glass Company.

Start	End	Description
1903	1905	[010] (F-Skirt) O.V.G.CO. (R-Skirt) PETTICOAT PONY SB

1903 to 1903 **Harloe Insulator Company** **Elmer, New Jersey**
1903 to 1906 **Hawley, Pennsylvania**

Harloe purchased the Hawley, PA factory property in 1902. Prior to starting production there, they took over operation of the "lower" glass works in Elmer, NJ, from the Sterling Glass Company, in March, 1903. In August the plant was closed for repairs to the furnace, and then in October, 1903 Albert Sturr sold the plant to the Parker Brothers Glass Manufacturers, and Harloe vacated the plant and made use of their plant in Hawley, PA. In August, 1906, the Harloe Insulator Company property was sold at auction after a 1904 note was not paid. It is not sure if baby signals were made in both Elmer and Hawley, or just Hawley. Shards of other Harloe insulators have been found in Elmer, so it is quite possible that they were made in both locations.

Start	End	Description
1903	1906	[010] (F-Skirt) HAWLEY P.A./U.S.A. (R-Skirt) » SB

1903 to 1912 **New Lexington High Voltage Porcelain Company** **New Lexington, Ohio**

The New Lexington High Voltage Porcelain Company was incorporated in March 1903. They operated for around 10 years with little competition. When Pittsburg High Voltage in 1908 and Ohio Brass Company in 1910 entered the market, their fortunes went down. By 1912 the company was in financial difficulty, and was sold at sheriff's sale in October, 1912. The plant was sold several times, and was bought by General Porcelain Co. in June 1918. G.P. CO. stripped the plant and sold the idle property in July.

All examples appear to have been unembossed.

Start	End	Description
1903	1912	N-N {New Lexington} U-239 [200] Light Tan; [250] {flat inner skirt} metallic brown, gray U-240A [050] {flat inner skirt} Tan

1904 to 1908 **Lima Insulator Company** **Lima, New York**

When Fred Locke "retired" from Locke, he secretly helped start the Lima Insulator Co. in nearby Lima, NY. It was incorporated in July, 1904. The plant was almost totally destroyed by fire in September, 1908, and the company was declared bankrupt in December. The land was purchased by the Locke family in April, 1909. The plant was rebuilt, but after a plant accident badly hurt Mort Locke, the entire Lima operation was sold to Locke Insulator Mfg Co in January 1910.

Start	End	Description
1904	1908	N-N {Lima}
		U-239B [150] brown

1905 to 1915 **R. Thomas & Sons, Company** **East Liverpool, Ohio**

The Thomas Company has a long history. Founded in 1873 as the American Knob Works in East Liverpool OH, they re-organized and expanded in 1884 for the production of porcelain insulators, when they were renamed to R. Thomas & Sons. They incorporated under this name in 1892. A plant in Lisbon OH for the manufacture of semi-porcelain china was absorbed by R. Thomas & Sons in 1905 and converted to the manufacture of porcelain insulators. The Lisbon plant was converted and enlarged in 1918, and the old East Liverpool plant was closed in 1927. The company continued until 1957, when they were bought by the H. K. Porter Company.

Initially focused on high voltage insulators, it was not until about 1907 that a reasonably large line of the smaller uniparts was cataloged. They cataloged the U-239 dry process insulators in the 1907 to 1920 period. Dry process porcelain was made circa 1905-1915 in East Liverpool.

Start	End	Description
1905	1915	U-239 [050] (F-Skirt) THOMAS {dry process, carved top, emb} brown, white U-239A [050] (F-Skirt) THOMAS brown
1905	1915	N-N {Thomas} U-238B [200] rust/mustard U-239 [300] {dry process, carved top} gray

1908 to 1910 **Johns-Manville Company** **New York, New York**

Johns-Manville jobbed insulators from Pittsburg and others such as Ohio Brass, Thomas, and New Lexington during the 1900-1910 period. The marked insulators were made by Pittsburg High Voltage Insulator Company.

Start	End	Description
1908	1910	U-241A [050] (F-Skirt) JOHNS-MANVILLE {Pittsburg, inc}

1908 to 1922 **Pittsburg High Voltage Insulator Company** **Derry, Pennsylvania**

A group led by C. M. Semler bought an idle china company plant in Derry PA, and founded the Pittsburg High Voltage Insulator Company in 1908. They started manufacturing small pin type units, and gradually expanded into higher voltage units and suspensions. Westinghouse became the selling agent around 1910 or 11, and

bought a controlling interest in the company in 1914. They gradually increased their ownership until 1922, at which point it was wholly owned by them, and the name was changed to the Westinghouse High Voltage Insulator Company.

Many of their products are made from two piece molds, resulting in a MLOD. Virtually all their insulators have unglazed pinholes, the top of which is either perfectly flat or a combination of concentric circles. Pittsburg made many NO NAME styles, and also manufactured the JOHNS-MANVILLE U-241A.

Start	End	Description
1908	1922	U-239 [050] (F-Skirt) HVIC {Pittsburg, emb}
1908	1922	N-N {Pittsburg} U-230 [050] brown, white U-231 [050] brown, black U-232 [050] {Pittsburg 14) brown U-233 [050] brown, light blue; (unreported Pittsburg 14) U-239A [200] {Pittsburg 35-1, MLOD} brown U-240 [150] brown U-241A [050] brown U-241B [050] {Pittsburg 29, MLOD} brown, white, light blue

1910 to 1915 **Illinois Electric Porcelain Company** **Macomb, Illinois**

In 1910, the Illinois Electric Porcelain Company was founded in Macomb, IL by C. W. Kettron, as a dry press manufacturer of knobs and tubes. Production of dry press pin types occurred shortly thereafter. In 1915, they started to produce wet process pin types, but continued to produce dry process for some time. All the early production was marked with the company's unregistered trademark, "MACOMB", until the TRIANGLE-M trademark started to be used in 1915.

Start	End	Description
1910	1915	[050] (F-Skirt) MACOMB {dry process, emb} U-239B brown, white

1902 to 1921 **Locke Insulator Manufacturing Company** **Victor, New York**
1910 to 1919 **Lima, New York**

Fred M. Locke incorporated his company in September, 1902, with a group of Rochester investors. He retained majority ownership until he retired in December, 1904. General Electric purchased a major interest in October, 1920.

The old Lima Insulator Company plant, which had burned in 1908, was purchase by Locke in January, 1910. The plant burned again in January 1919 and was closed. It was sold in 1920 to William Harvey who formed the Porcelain Insulator Company.

Start	End	Description
1910	1915	N-N (Locke) U-242A [050] Brown

1911 to 1927 **General Porcelain Company** **Parkersburg, West Virginia**

General Porcelain Company was formed in 1911 by the combination of a number of small electrical porcelain companies. These plants were mostly dismantled and had their equipment sent to a new facility built in Parkersburg, West Virginia. They bought the defunct New Lexington High Voltage Porcelain Company plant in Ohio in 1918, which was probably the most important factor in them getting into the insulator business. It is unknown when G.P. CO. started making wet process pin types, but undoubtedly by 1923, when their first catalog of pin-type insulators is known. In 1927 the company merged with others (Findlay Electrical Porcelain Company & Federal Porcelain Company among others) to form Porcelain Products Inc.

Start	End	Description
1911	1927	U-238B [050] (F-Skirt) G.P.CO. {inc} brown, light blue, blue, cobalt blue
1911	1927	N-N {G.P. Co.} U-238B [150] light blue with dark blue specs, midnight blue, dark blue-gray U-239B [100] light blue

1912 to 1914 **California Glass Insulator Company** **Long Beach, California**
1914 to 1916 **California Glass Works** **Long Beach, California**

Power for the California Glass Insulator Company was hooked up March 27, 1912. They reorganized in 1914 under the name of California Glass Works. The plant was destroyed by flood in 1916 and never reopened. "Color altered flint glass" appears to be from before the reorganization, and green-blue-aqua from after.

Start	End	Description
1912	1914	(F-Skirt) CALIFORNIA SB [010] in "color altered flint glass"
1914	1915	(F-Skirt) CALIFORNIA SB [010] in green
1914	1916	(F-Skirt) CALIFORNIA SB [010] in aqua, blue

1920 to 1923 **Gayner Glass Works** **Salem, New Jersey**

When Brookfield went out of business, the Gayner Glass Works was one of the companies that got into the insulator business. An established glass company, insulator production started in late 1920 or early 1921, and was supervised by J. William Gayner. In late 1922 or early 1923, J. William Gayner joined the Lynchburg Glass Corporation. He moved the entire operation to Lynchburg, thus ending production at Gayner. Note that it is possible that some Gayner embossed units were made in 1923 by Lynchburg.

There were probably 10 to 12 molds – known are 1-3, 5-8, 10-11.

Start	End	Description
1920	1923	[010] (F-Skirt) GAYNER (R-Skirt) NO. 140/[Number] SDP

1923 to 1925 **Lynchburg Glass Corporation** **Lynchburg, Virginia**

Another company that started producing insulators shortly after Brookfield went out of business. Insulator production began in November, 1923. Quality issues and other concerns prevented them from making a profit, and the company closed at the end of May, 1925. Production records indicate that they produced 31,074 CD 160s during the time from 11/30/1923 to 02/21/1925. Note that this includes 7,716 "No 140s" that they produced at the end of 1923. These might be Gayner embossed units, the Type I "pinch dome" Lynchburgs, or something else.

Figure 6 Type I (left) and Type II (right)

There were probably 10 to 12 molds – known are 1-8, 10-11.

Start	End	Description
1923	1924	[025] (F-Skirt) ¨ /LYNCHBURG (R-Skirt) NO.32/MADE IN [Number] U.S.A. SDP {Type I}
1923	1925	[020] (F-Skirt) ¨ /LYNCHBURG (R-Skirt) NO.32/MADE IN [Number] U.S.A. SDP {Type II}
1924	1925	[010] (F-Skirt) ¨ /LYNCHBURG (R-Skirt) NO.32/MADE IN [Number] U.S.A. RDP {Type II}

1936 to 1938 **Whitall Tatum Company** **Millville, New Jersey**
1938 to 1949 **Armstrong Cork Company** **Millville, New Jersey**

Whitall Tatum got into insulator production around 1922, shortly after Brookfield went out of business. Pre-production insulators were delivered to Western Electric in 1922. Sales and production records indicate that they didn't start production of baby signal style until around 1936. When Armstrong took over in 1938, they continued to use the Whitall Tatum name. They sold insulators as "Armstrong's Whitall Tatum Glass Insulators".

Start	End	Description
1936	1938	[010] (F-Skirt) WHITALL TATUM CO. № 14/[Number] (R-Skirt) MADE IN U.S.A. ¸ SB  **Figure 7 Narrow and Wide domes** Known molds 3, 5-8, 10, 13, 15-16. 9 is known not to have been made.
1938	1943	[030] (F-Skirt) WHITALL TATUM № 14/[Number] (R-Skirt) MADE IN U.S.A. ¸ SB Version without the CO but with the WT in triangle was probably short lived. In fact, I have not been able to confirm that this EIN actually exists.
1943	1949	[020] (F-Skirt) WHITALL TATUM № 14/[Number] (R-Skirt) MADE IN U.S.A. Á /[Number and dots] SB The mold set made in 1943, and sales records indicate that they sold 10,324 of these in 1943. All of these EIN have 4 dots around the 1943, indicating that they were made in the 4th quarter of 1943. Known molds 0, 2, 4-5, 7, 10, 13-16. 1, 3, 8-9, 12 are known not to have been made.

1922 to 1935 **McLaughlin Glass Company** **Vernon, California**

William McLaughlin worked for a variety of glass companies (include R. Good in Colorado) before starting his own company in 1920 or 1922. Production at this factory continued until a lawsuit forced the company to close in 1933 or 1935. I use 1922-1935 as the dates, to coincide with the dates for Crystallite Products.

Start	End	Description
1922	1935	[010] (F-Skirt) M„LAUGHLIN (R-Skirt) Nœ 14 FDP [020] (F-Skirt) M„LAUGHLIN (R-Skirt) Nœ 14 RDP [030] (F-Skirt) M„LAUGHLIN (R-Skirt) Nœ 14 SDP

1935 to 1940 **Maydwell & Hartzell, Incorporated** **San Francisco, California**

Crystallite Products Corporation in Glendale, California purchased the equipment from the McLaughlin Glass Company after they went out of business in 1935. Crystallite manufactured exclusively for Maydwell & Hartzell. M&H headquarters were in San Francisco, with offices in Los Angeles and later (the late 1930s or early 1940s) Portland, Oregon and Washington as well. Crystallite continued production until 1939 or 1940, when Maydwell became distributors for Owens-Illinois insulators.

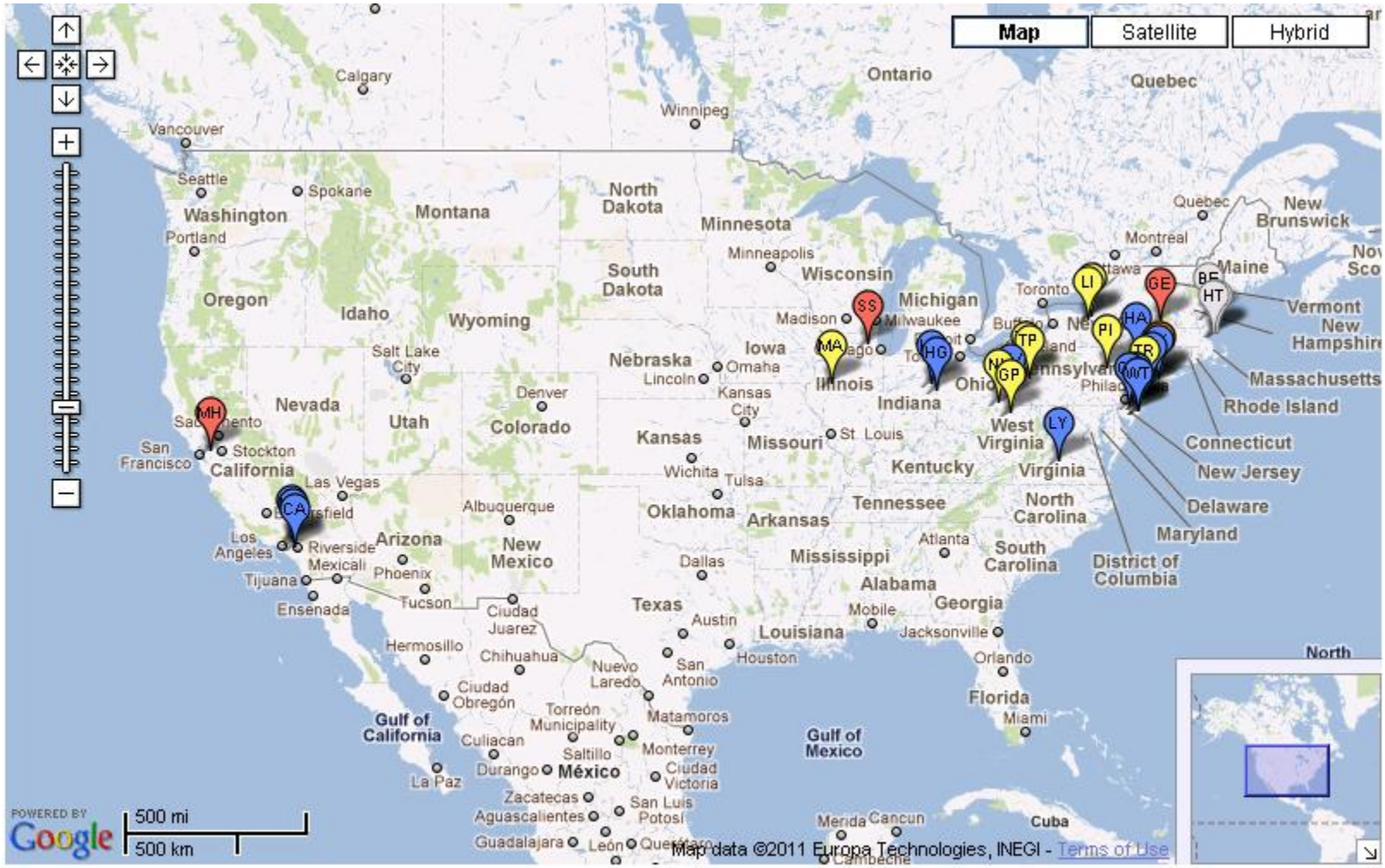
Start	End	Description
1935	1940	[010] (F-Skirt) MAYDWELL-14 (R-Skirt) U.S.A. FDP [020] (F-Skirt) MAYDWELL-14 (R-Skirt) U.S.A. RDP [050] {'M„LAUGHLIN' blotted out under 'MAYDWELL'} [030] (F-Skirt) MAYDWELL-14 (R-Skirt) U.S.A. SB [040] (F-Skirt) MAYDWELL-14 (R-Skirt) U.S.A. SDP [045] {blot out under 'U.S.A.'}

1949 to 1957 **Armstrong Cork Company** **Millville, New Jersey**

Armstrong took over Whitall Tatum in 1938, but continued to use the Whitall Tatum name. They sold insulators as "Armstrong's Whitall Tatum Glass Insulators". Production of glass insulators ceased in 1969. Their baby signal, though, was declared obsolete in 1957, and the last one was made between 1955 and 1957.

Start	End	Description
1949	1957	[010] (F-Skirt) À æ NO.14 (R-Skirt) MADE IN U.S.A. Á [Numbers and dots] SB Mold set was made in 1949, 1955 is the last date seen. In fact, 1953 and 1955 are the only two dates I have ever seen. Known molds 1-2, 7-8, 11, 15

Manufacturer and User Locations



Blue = Glass Manufacturer Red = Glass User
Yellow = Porcelain Manufacturer Orange = Porcelain Jobber
Grey = Hardware Manufacturer

	Company
SS 	**Shay, Stephens & Company** 134 VanBuren Avenue Chicago, IL 1889 - 1890
HG 	**Hemingray Glass Company** 1890 - 1933 **Owens-Illinois Glass Company** 1933 - 1956 1610 South Macedonia Avenue Muncie, IN
SW 	**H.E.Swift Manufacturing Company** (Brodie Tree Insulator) 34 Oliver Street Boston, MA 1890 - 1894
KC 	**King City Glass Works** 1893 - 1895 **Marion Fruit Jar & Bottle Company** 1896 - 1898 East 4th Street and Factory Avenue Fairmount, IN
BY 	**Brookfield Glass Company** Grand and Maujer Steets and Morgan Avenue Brooklyn, NY 1893 - 1906
BE 	**The Brodie Electrical Company** (Brodie Tree Insulator) Manchester, NH 1894 - 1914
BJ 	**Brookfield Glass Company** Old Bridge, NJ 1898 - 1922
HT 	**High Tension Specialty Company** (Holmes Tree Insulator) Newton, MA 1899 - 1925
EU 	**Novelty Glass Manufacturing Company** 1901 - 1903 **Elmer Glass Company** 1904 - 1907 "Upper Works" Elmer NJ
GE 	**General Electric Company** Schenectady, NY 1901 - 1910

	Company
EL 	**Sterling Glass Company** 1902 - 1903 **Harloe Insulator Company** 1903 - 1903 "Lower Works" Park Avenue and Center Street Elmer, NJ
LK 	**Locke Insulator Manufacturing Company** Victor, NY 1902 - 1921
TR 	**Trenton Porcelain Company** Prince and Meade Street Trenton, NJ 1902 - 1920s
OV 	**Ohio Valley Glass Company** S.R. 146 just east of S.R. 821 Pleasant City, OH 1903 - 1905
HA 	**Harloe Insulator Company** Hawley, PA 1903 - 1906
NL 	**New Lexington High Voltage Porcelain Company** New Lexington, OH 1903 - 1912
LI 	**Lima Insulator Company** 1904 – 1908 **Locke Insulator Manufacturing Company** 1910 – 1919 Lima, NY
TP 	**R. Thomas & Sons, Company** Liverpool, OH 1905 – 1915
TB 	**R. Thomas & Sons, Company** Lisbon, OH 1905 - 1957
PI 	**Pittsburg High Voltage Insulator Company** Derry, Pennsylvania 1908 - 1922
JM 	**Johns-Manville Company** Madison Avenue and 41st Street New York, New York 1908 - 1910

	Company
MA 	**Illinois Electrical Porcelain Company** Macomb, IL 1910 - 1915
CA 	**California Glass Insulator Company** 1912 - 1914 **California Glass Works** 1914 - 1916 Long Beach, CA
GP 	**General Porcelain Company** Parkersburg, West Virginia 1913 - 1927
GA 	**Gayner Glass Works** Salem, NJ 1920 - 1923
MC 	**McLaughlin Glass Company** Vernon, CA 1922 - 1935
LY 	**Lynchburg Glass Corporation** Anne Street and Hudson Street Lynchburg, VA 1924 - 1925
WT 	**Whitall Tatum Company** 1924 - 1938 **Armstrong Cork Company** 1938 - 1957 Lower Works 400 block South Second Street Millville, NJ 08332
WT 	**Whitall Tatum Company** 1924 - 1938 Upper Works 210 Buck Street Millville, NJ 08332
MH 	**Maydwell & Hartzell, Incorporated** 10th Street San Francisco, CA 1935 - 1940
CP 	**Crystallite Products Corporation** Western Avenue and San Fernando Road. Glendale, CA 1935 - 1940